California Regional Water Quality Control Board
Lahontan Region

Linda S. Adams
Secretary for
Environmental Protection

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Arnold Schwarzenegger
Governor

May 5, 2009

TO ALL INTERESTED PERSONS AND AGENCIES:

TENTATIVE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT FOR DEPARTMENT OF FISH&GAME, PAIUTE CUTTHROAT TROUT RESTORATION PROJECT, SILVER KING CREEK, ALPINE COUNTY

Enclosed is a tentative NPDES permit and Monitoring and Reporting Program for the above-referenced project. Information about the project and its environmental document is available at: http://www.dfg.ca.gov/ under the title of "Silver King Creek, Paiute Cutthroat Trout EIR/EIS." The California Regional Water Quality Control Board requests that you review the enclosed documents and provide us with your written comments no later than **June 5, 2009**. Water Board staff will consider comments received on the tentative NPDES permit, and prepare a proposed Board Order for consideration by the Water Board. Comments received after May 18 cannot be given full consideration by staff in preparing the proposed Board Order. The Water Board will be asked to consider adopting the proposed Board Order at the meeting scheduled for **July 8 and 9, 2009** in South Lake Tahoe, California.

The Water Board publishes its agenda on the Internet at:

http://www.waterboards.ca.gov/lahontan/board_info/agenda/

If you prefer to receive a hard copy of the Water Board meeting agenda, please contact Carrie Hackler of the Water Board at (530) 542-5404.

If you have any questions or comments regarding the enclosed documents you may contact Dr. Bruce Warden, Environmental Specialist III, at (530) 542-5416, or me at (530) 542-5436.

Lauri Kemper
Supervising Engineer, North Lahontan Watersheds Division

Enclosures:
1. Comment form
2. Fact Sheet
3. Tentative Board Order and Monitoring and Reporting Program

FACT SHEET

This Fact Sheet has been prepared under a standardized format to accommodate a broad range of discharge requirements for dischargers in California. Only those sections or subsections that are specifically identified as "not applicable" have been determined not to apply to this Discharger.

I. PERMIT INFORMATION

The following table summarizes administrative information related to the facility.

Table F-1. Facility Information

WDID	6A020405008
Discharger	California Department of Fish and Game
Name of Facility	Silver King Creek
Facility Location	
	Silver King Creek (between Llewllyn Falls and Snodgrass Creek)
	Alpine County
Facility Contact, Title and Phone	Stafford Lehr, California Department of Fish and Game, 1701 Nimbus Road, Ste. A, Rancho Cordova, CA 95670, Telephone/Fax (916) 358-2838
Authorized Person to Sign and Submit Reports	Same as facility contact
Mailing Address	California Department of Fish and Game
	1701 Nimbus Road, Ste. A,
	Rancho Cordova, CA 95670
Billing Address	Same as Mailing Address
Type of Facility	Application of rotenone for Paiute Cutthroat Trout restoration project
Major or Minor Facility	Minor
Threat to Water Quality	Deminimus Category 1
Complexity	Deminimus Category 1
Pretreatment Program	N/A
Reclamation Requirements	N/A
Facility Permitted Flow	Not Applicable
Facility Design Flow	Not Applicable
Watershed	East Fork Carson River Hydrologic Unit, Markleeville Hydrologic Area
Receiving Water	Silver King Creek
Receiving Water Type	Fresh Water

C. Summary of Existing Requirements and Self-Monitoring Report (SMR) Data

Not Applicable.

D. Compliance Summary

Not Applicable.

E. Planned Changes

Not Applicable.

III. APPLICABLE PLANS, POLICIES, AND REGULATIONS

The requirements contained in the proposed Order are based on the requirements and authorities described in this section.

A. Legal Authorities

This Order is issued pursuant to section 402 of the federal Clean Water Act (CWA) and implementing regulations adopted by the USEPA and chapter 5.5, division 7 of the California Water Code (commencing with section 13370). It shall serve as an NPDES permit for point source discharges from this facility to surface waters.

B. California Environmental Quality Act (CEQA)

Pursuant to Water Code section 13389, this action to adopt an NPDES permit is exempt from the provisions of CEQA, Public Resources Code sections 21000 - through 21177. However, CEQA analysis is needed to provide an exemption to the California Toxics Rule (CTR) and the State Water Board's *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (aka State Implementation Plan or SIP).

C. State and Federal Regulations, Policies, and Plans

1. **Water Quality Control Plans.** The Lahontan Water Board has adopted a *Water Quality Control Plan for the Lahontan Region* (the Basin Plan) that designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters addressed through the Plan. All waters, with certain exceptions, should be considered suitable or potentially suitable for municipal or domestic supply. In addition, the Basin Plan contains a policy and implementation program for fisheries recovery programs, specifically allowing for the use of rotenone applications when specified conditions are met. Requirements of this Order implement those conditions given in the Basin Plan.

2. **Thermal Plan.** Not Applicable.

permitted discharge is consistent with the antidegradation provisions of 40 CFR 131.12 and State Water Board Resolution No. 68-16.

7. **Anti-Backsliding Requirements.** Not Applicable

D. Impaired Water Bodies on CWA 303(d) List

Receiving waters for discharges subject to this Order are not identified as impaired pursuant to CWA section 303 (d), which requires states to identify receiving waters which are not meeting applicable water quality standards after imposition of technology-based requirements on point source discharges, as required by CWA sections 301 (b) (1) (A and B).

E. Other Plans, Policies and Regulations - Not Applicable

IV. RATIONALE FOR EFFLUENT LIMITATIONS AND DISCHARGE SPECIFICATIONS

The CWA requires point source dischargers to control the amount of conventional, non-conventional, and toxic pollutants that are discharged into the waters of the United States. The control of pollutants discharged is established through effluent limitations and other requirements in NPDES permits. NPDES regulations establish two principal bases for effluent limitations. 40 CFR 122.44 (a) requires permits to include applicable technology-based limitations and standards; and at 40 CFR 122.44 (d) permits are required to include water quality-based effluent limitations (WQBELs) to attain and maintain applicable numeric and narrative water quality criteria to protect the beneficial uses of the receiving water. This project involves the application of rotenone and various byproducts and carriers, and/or synergists (rotenolone, 1-methyl-2-pyrrolidinone (methyl pyrrolidone), diethylene glycol monoethyl ether (diethylene glycol ethyl ether), 1-hexanol, sec-butylbenzene, 1-butylbenzene (n-butylbenzene), 1,4-diethylbenzene), 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene (*aka* mesitylene), 1,2,4,5-tetramethylbenzene, toluene, 4-isopropyltoluene (p-isopropyltoluene), methylnaphthalene, naphthalene, triethylene glycol, tetraethylene glycol, pentaethylene glycol, hexaethylene glycol, and "Tall Oil" (naturally-occurring fatty acids and resin acids from wood) and potassium permanganate, The Order provides for a variance to water quality criteria to accomplish the project objectives. Temporary exceedances of Basin Plan prohibitions and water quality objectives will occur.

A. Discharge Prohibitions

Not applicable.

Where reasonable potential has been established for a pollutant, but there is no numeric criterion or objective for the pollutant, WQBELs must be established in accordance with the requirements of 40 CFR 122.44 (d) (1) (vi), using (1) USEPA criteria guidance under CWA section 304 (a), supplemented where necessary by other relevant information; (2) an indicator parameter for the pollutant of concern; or (3) a calculated numeric water quality criterion, such as a proposed state criterion or policy interpreting the State's narrative criterion, supplemented with other relevant information.

2. Applicable Beneficial Uses and Water Quality Criteria and Objectives

Beneficial uses for receiving waters subject to this Order are established by the Basin Plan and are described by Finding 16 of the Order. Numeric water quality criteria applicable to this receiving water are established by the CTR and the NTR and by the Basin Plan. Specifically for this project, the Water Board has established receiving water criteria for the application of rotenone formulations and for potassium permanganate.

3. Determining the Need for WQBELs

The Water Board amended the Basin Plan in 1990 to allow conditional use of rotenone by DFG. The Basin Plan rotenone policy allows use of rotenone by DFG for certain specific types of fishery management activities, including restoration or enhancement of threatened or endangered species. Eligibility criteria and conditions are set forth in Chapter 4 of the Basin Plan. For DFG projects meeting the eligibility criteria and conditions, the Basin Plan rotenone policy allows the Water Board the ability to grant DFG a variance from meeting Basin Plan water quality objectives (such as the pesticides and toxicity objectives) that would otherwise apply. Projects qualifying for the variance are instead subject to specific water quality objectives for DFG rotenone use established in Chapter 3 of the Basin Plan. A Memorandum of Understanding (MOU) between the Water Board and DFG was executed in 1990 to implement the policy. In 1993, the Water Board adopted additional Basin Plan amendments relating to rotenone use.

Therefore, determination of WQBELs is not applicable, and the specific receiving water quality criteria for rotenone plus formulation carriers, and/or synergists, and potassium permanganate (including color criteria) apply. Temporary degradation of water quality will occur for a period not to exceed two weeks after application of rotenone.

4. WQBEL Calculations

Not Applicable

- after a two-week period has elapsed from the date that rotenone application was completed, no chemical residues resulting from the treatment shall be present at detectable levels within or downstream of project boundaries;
- no chemical residues resulting from rotenone treatments shall exceed detection levels in ground water at any time; and
- chemical residues resulting from rotenone treatment must not exceed the limitations listed above for pesticides.

B. Groundwater – not applicable

VI. RATIONALE FOR MONITORING AND REPORTING REQUIREMENTS

NPDES regulations at 40 CFR 122.48 require that all NPDES permits specify requirements for recording and reporting monitoring results. Water Code sections 13267 and 13383 also authorize the Lahontan Water Board to require technical and monitoring reports. Rationale for the monitoring and reporting requirements contained in the Monitoring and Reporting Program (MRP) of this Order, is presented below.

A. Influent Monitoring

Not Applicable

B. Effluent Monitoring

Not Applicable

C. Whole Effluent Toxicity (WET) Testing Requirements

Not Applicable

D. Receiving Water Monitoring

1. Surface Water

Surface Water Monitoring is required as described in the MRP of the Order.

2. Groundwater - Not Applicable

E. Other Monitoring Requirements

See special provisions.

4. **Construction, Operation, and Maintenance Specifications** –

   Not Applicable

5. **Special Provisions for Municipal Facilities (POTWs Only)** –

   Not Applicable

6. **Other Special Provisions** – Not Applicable

7. **Compliance Schedules** – Not Applicable

VIII. PUBLIC PARTICIPATION

The California Water Resources Control Board, Lahontan Region (Lahontan Water Board) is considering the issuance of a National Pollutant Discharge Elimination System (NPDES) permit for the Paiute Cutthroat Trout Restoration Project. As a step in the permit adoption process, the Lahontan Water Board staff has developed tentative NPDES permit. The Lahontan Water Board encourages public participation in the NPDES permit adoption process.

A. Notification of Interested Parties

The Lahontan Water Board has notified the Discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for the discharge and has provided them with an opportunity to submit their written comments and recommendations. Notification was provided through the Tahoe Daily Tribune and the (Minden, NV) Record-Courier.

B. Written Comments

The staff determinations are tentative. Interested persons are invited to submit written comments concerning the tentative NPDES Permit. Comments must be submitted either in person or by mail to the Lahontan Water Board at the address above on the cover page of this Order.

To receive a full response from Lahontan Water Board staff and consideration by the Lahontan Water Board, written comments should be received at the Lahontan Water Board offices by 5:00 p.m. on June 5, 2009.

C. Public Hearing

The Lahontan Water Board will provide opportunity for a public hearing and may hold a public hearing, as necessary, on the tentative NPDES permit during its regular Board meeting on the following date and time and at the following location:

Date: July 8-9, 2009
Time: Two-day meeting beginning at 4:00 pm on July 8, 2009

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

BOARD ORDER NO. R6T-2009-(TENT)
WDID NO. 6A020405008
NPDES NO. CA0103209

WASTE DISCHARGE REQUIREMENTS AND
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT

FOR

CALIFORNIA DEPARTMENT OF FISH AND GAME
PAIUTE CUTTHROAT TROUT RESTORATION PROJECT

Alpine County

The California Regional Water Quality Control Board, Lahontan Region (Water Board) finds:

1. Discharger

   The California Department of Fish and Game (DFG) is responsible for carrying out a variety of fishery management activities. These activities are designed to protect and maintain valuable aquatic ecosystems and sport fisheries. DFG is also responsible under State and federal law for the restoration and protection of threatened and endangered species. For the purposes of this Order, DFG is referred to as the "Discharger."

2. Project Purpose

   The Discharger, in cooperation with the U.S. Fish and Wildlife Service (USFWS) and the U.S. Department of Agriculture, Humboldt-Toiyabe National Forest (USFS), proposes to use the aquatic pesticide rotenone as part of recovery efforts for Paiute Cutthroat Trout, *Oncorhynchus clarki seleniris*, at Silver King Creek. Paiute Cutthroat Trout is one of the rarest subspecies of trout in North America, indigenous only to the Silver King Creek watershed. Paiute Cutthroat Trout was listed by the USFWS as federally endangered on October 13, 1970 (Federal Register 35:16047) and reclassified as federally threatened on July 16, 1975 (Federal Register 40:29863). Rotenone will be used to eradicate introduced fish species that can out-compete and interbreed with Paiute Cutthroat Trout, from portions of Silver King Creek and associated tributaries, prior to introduction of the native trout.

   The Paiute Cutthroat Trout was successfully reintroduced to upper portions of Silver King Creek, above a natural fish barrier (Llewellyn Falls), following rotenone treatments in 1991, 1992, and 1993. The Discharger is concerned that non-native fish from below this barrier could be introduced by humans into the area where the pure population of Paiute Cutthroat Trout has been reestablished, threatening restoration efforts. The current project would help safeguard the restoration of Paiute Cutthroat Trout by re-introducing the endangered fish to six miles of the main-stem Silver King Creek downstream of Llewellyn Falls, and five miles of associated tributary streams, all of which comprise the historic range of the fish. This project is identified in the USFWS Revised Recovery Plan for the Paiute Cutthroat Trout

and ground waters throughout the Lahontan Region. The Basin Plan can be viewed or downloaded on the Internet at http://www.swrcb.ca.gov/rwqcb6/BPlan/BPlan_Index.htm, reviewed at the Water Board office, or purchased at a nominal cost. This permit implements the Basin Plan.

6. Water Board Policy for DFG Rotenone Use

The Water Board amended the Basin Plan in 1990 to allow conditional use of rotenone by DFG. The Basin Plan rotenone policy allows use of rotenone by DFG for certain specific types of fishery management activities, including restoration or enhancement of threatened or endangered species. Eligibility criteria and conditions are set forth in Chapter 4 of the Basin Plan. For DFG projects meeting the eligibility criteria and conditions, the Basin Plan rotenone policy allows the Water Board the ability to grant DFG a variance from meeting Basin Plan water quality objectives (such as the pesticides and toxicity objectives) that would otherwise apply. Projects qualifying for the variance are instead subject to specific water quality objectives for DFG rotenone use established in Chapter 3 of the Basin Plan. A Memorandum of Understanding (MOU) between the Water Board and DFG was executed in 1990 to implement the policy. In 1993, the Water Board adopted additional Basin Plan amendments relating to rotenone use.

7. Reason for Action

In 2001, the Ninth Circuit Court of Appeals held that point-source discharges of pollutants associated with use of aquatic pesticides in waters of the United States require a National Pollutant Discharge Elimination System (NPDES) permit if the pollutant leaves any residue in the water after its application that would qualify as a chemical waste product. (Headwaters, Inc. v. Talent Irrigation District[1]) In 2005, the Ninth Circuit further held that the use of aquatic pesticides applied intentionally and in accordance with the EPA-approved FIFRA label does not require an NPDES permit if there are no unintended effects associated with the use of the product and no residue remains after the pesticide performs its intended function. (Fairhurst v. Hagener)[2] In 2009, the Sixth Circuit Court of Appeal vacated EPA's regulation exempting pesticides applied in accordance with the FIFRA label from NPDES permit requirements as inconsistent with the Clean Water Act. (National Cotton Council of America v. U.S. E.P.A.)[3] Accordingly, because the treatment of Tamarack Lake could result in limited residue remaining after the treatment and because of the likelihood of unintended effects on macroinvertebrates from the application of rotenone at some or all project locations, the discharge of pollutants associated with the application of rotenone for the Silver King Creek Project requires an NPDES permit.

8. Project Description

The Discharger proposes to apply rotenone in September 2009, with a second treatment planned for August or September 2010. A third treatment could be

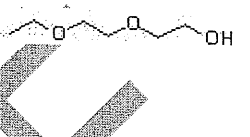
[1] Headwaters, Inc. v. Talent Irrigation District, (9th Cir. 2001) 243 F.3d 526.
[2] Fairhurst v. Hagener (9th Cir. 2005) 422 F.3d 1146;
[3] Nat'l Cotton Council of America v. U.S.E.P.A. (6th Cir. 2009) 553 F.3d 927.

ingredients in a variety of consumer products, including soft drink syrups (as an antioxidant), in plasticizers, suntan lotions and antifreeze, among other uses[4].

The structures and oral toxicities of the two most concentrated constituents in CFT Legumine are summarized below.

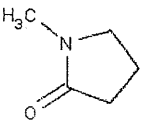
DIETHYLENE GLYCOL MONOETHYL ETHER

- Approximate concentration in formula: 569,000 mg/L
- Toxicology: RAT ORAL LD50: 4,700-9,740 mg/kg.
- Chemical formula: C6H14O3
- Chemical structure: C2H5OCH2CH2OCH2CH2OH



1-METHYL-2-PYRROLIDINONE

- Approximate concentration in formula: 90,000 mg/L
- Toxicology: RAT ORAL LD50: 3,914 mg/kg
- Chemical formula: C5H9NO



Nusyn-Noxfish/CFT Legumine™ will be applied at a target concentration of 0.5 to 1.0 mg/L formulation (25 to 50 µg/L rotenone) to all flowing streams. The discharge will take place over a period of 4-6 hours. Rotenone will be applied to streams using drip stations, with hand spraying in backwater areas as necessary. Mini-drips and gel or sand matrices may be used on small seeps if the possibility exists that they provide a sufficient amount of fresh water that fish may use to escape from treated waters.

Tamarack Lake would be treated with powdered rotenone if fish are found in the proposed monitoring. Powdered rotenone is the ground up cubé root and is comprised of 5 to 7% rotenone, 10 to 11% cube resins (associated rotenoid compounds) and 80 to 82% non-rotenoid compounds (other botanical or clay compounds).[7] The effects of powdered rotenone upon aquatic species are similar to those described above without the effects of the inactive ingredients. The powdered rotenone would be injected using a gasoline-powered pump below the surface of the water in either powdered form or a water based slurry from a non-motorized raft.

To contain the effects of rotenone within the project area and prevent a fish kill downstream of the Silver King Canyon, a neutralization station would be operated near Snodgrass Creek. The oxidizing agent potassium permanganate would be applied to Silver King Creek near Snodgrass Creek to neutralize rotenone, approximately 0.75 miles downstream of the lowest falls in Silver King Canyon.

Potassium permanganate would be applied at the resulting concentration of 2 to 4 mg/L. A generator powered auger would be used to apply the granular potassium permanganate. A back-up auger system would be on site in the event of primary

[7] CDFG. 1994. Final Programatic Environmental Impact Report (Subsequent). Rotenone use for fisheries management, July 1994.

native fish are found during the project time frame, including up to the final stream treatment, the lake will be treated as long as it occurs no later than November 2013. If treated, the agencies would not neutralize Tamarack Lake with potassium permanganate. The carrier-free rotenone applied to the lake will detoxify through natural degradation and breakdown.

9. Project Boundaries

The Basin Plan defines the project boundaries for rotenone projects as encompassing the treatment area, the detoxification area, and the area downstream of the detoxification station at Snodgrass Creek, up to a thirty-minute in-stream travel time. The project boundaries are determined in the field based on stream flow measurements immediately prior to treatment.

10. Proposition 65 Considerations

Four inert ingredients present in one or both proposed rotenone formulations (N-methyl-2-pyrrolidone, toluene, trichloroethylene, and naphthalene) are on the Proposition 65 list of chemicals known to the state of California to cause cancer or reproductive toxicity. The Proposition 65 statute is contained in California Health and Safety Code sections 25249.9-25249.13. Proposition 65 prohibits the discharge of chemicals known to cause cancer or reproductive toxicity. The California Department of Public Health is the state agency responsible for enforcing Proposition 65. Section 25249.11(b) specifically exempts state agencies from the statute's provisions. As a state agency, DFG is therefore exempt from Proposition 65.

11. Impacts to Non-target Aquatic Life—Benthic Macroinvertebrates

Rotenone treatment is expected to have short-term effects on benthic macroinvertebrate communities (invertebrates are expected to repopulate treated areas following treatment and beneficial uses must be restored within two years of the final treatment). The Discharger conducted benthic macroinvertebrate monitoring studies before, during, and for three consecutive years following rotenone treatments that occurred in portions of the Silver King Creek basin in 1991 through 1993. DFG also conducted a study of rotenone impacts on macroinvertebrates in Silver Creek (Mono County), which was treated for three years from 1994 to 1996. The previously-cited Negative Declaration for the Silver King Creek project asserts that "the results of the monitoring did not provide any evidence that rotenone use had affected macroinvertebrate abundance . . . [these studies] suggested that rotenone may have short-term impacts to sensitive aquatic invertebrates . . ." Based on those studies and the metrics evaluated, DFG concluded that the data do not suggest any significant long-term impacts to invertebrates lasting beyond the study periods. Vinson and Vinson (2007)[8] could not find long term impacts of rotenone treatments to aquatic macroinvertebrates in the dataset they reviewed for the Silver King Creek basin, but they also acknowledged there was no pre-project data

[8] M. R. and D.K. Vinson. 2007. An analysis of the effects of rotenone on aquatic invertebrate assemblages in the Silver King Creek Basin, California. Moonlight Limnology. Report Prepared for the Humboldt-Toiyabe National Forest. 255 pp.

County) Wolf Creek (Mono County), and the 1991-1993 treatments in upper portions of the Silver King Creek drainage for Paiute Cutthroat Trout restoration.

The Water Board waived waste discharge requirements for those projects. Following the Ninth Circuit Court of Appeal's decisions in Headwaters, Inc. v. Talent Irrigation District and Fairhurst v. Hagener, and the Sixth Circuit Court of Appeal' decision in National Cotton Council of America v. U.S. E.P.A., NPDES permits are required for the discharge of aquatic pesticides to waters of the U.S. if any residue remains after the pesticide has performed its intended function or there are any unintended effects of the use of the pesticide. Because the treatment of Tamarack Lake could result in limited residue remaining after the treatment and because of the likelihood of unintended effects on macroinvertebrates from the application of rotenone throughout the project area, there is no basis to waive waste discharge requirements for this rotenone treatment project.

On July 6, 2005, the Discharger received an NPDES permit from the State Water Board (Order No. 2005-0010-DWQ) for a rotenone treatment project in the Silver King Creek drainage for Paiute Cutthroat Trout restoration. Californians for Alternatives to Toxics and several other organizations and individuals filed suit in both state and federal court seeking to have the NPDES permit vacated and to enjoin the Discharger (in the state case) and USFS (in the federal case) from engaging in any acts in reliance on that permit.

The state case was filed in the Sacramento County Superior Court and sought a writ of mandate (Case No. 050501160). On September 12, 2005, the Court denied the petitioners' application for a temporary restraining order. In so doing, the Court found a "strong and legitimate interest in preserving the Paiute cutthroat trout." The petitioners subsequently dismissed the state case after the federal district court issued an injunction barring the project.

The federal case was filed in the United States District Court, Eastern District of California (Case No. Civ. S-05-1633 FCD KJM). The district court issued a temporary restraining order on August 31, 2005 and a preliminary injunction on September 1, 2005, prohibiting USFS from conducting or allowing to be conducted any portion of the Paiute cutthroat trout restoration project. The Court found both that the plaintiffs demonstrated a strong likelihood of success on their claim that macroinvertebrates would be irreparably harmed and that they raised serious questions as to the adequacy of the USFS's Environmental Assessment and as to whether USFS should have conducted an Environmental Impact Statement.

On September 30, 2005, the Discharger requested that the State Water Board rescind the NPDES permit for the project. On October 20, 2005, the State Water Board rescinded the NPDES permit.

The DFG has conducted many rotenone treatments in the Lahontan Region in the past. Table 1 below lists various rotenone treatments that DFG has conducted in the Lahontan Region along with details regarding accompanying challenges and successes. Much has been learned by DFG from historical rotenone treatments. Based on lessons learned from these earlier treatments, methods used to employ treatments to date are the best practicable for achieving successful resource management.

		measured 17.0_ ppb).	
1991	Silver King Crk.	None	
1992	Wolf Crk.	None	
1992	Silver King Crk.	Unexpected fish kill below project boundary believed due to potassium permanganate toxicity (DFG estimate of 600 fish >6 in.; USFS estimate of 1000 fish)	1) restrict back-to-back treatments; 2) monitor permanganate residuals; 3) treat as early in year as possible, and; 4) keep written records of formula and flows
1993	Silver King Crk.	Rotenone detected downstream of project (measured at 2.2 ppb); naphthalene detected downstream of project at concentrations (36 ppb) exceeding Basin Plan objective of 25 ppb, believed due to low water temperature	Conduct flowing water treatments only when water temperature exceeds 5°C. Maintain a residual concentration of potassium permanganate of 0.75 to 1.0 ppm using Fujimura 2005.
1994	Silver Crk, Mono	None	

14. Project Information Submitted by Discharger Meets Requirements for Variance

To be an eligible for rotenone use in fisheries management projects, the project must meet the following conditions:

1. The purpose of the proposed project must be one of the following:

   (a) The restoration and protection of threatened or endangered species.

   (b) The control of fish diseases where the failure to treat could result in significant damage to fisheries resources or aquatic habitat.

(f) A suitable monitoring program will be followed to assess the effects of treatment on surface and ground waters, and on bottom sediments.

(g) For each project, the DFG has satisfied the requirements of the California Environmental Quality Act (CEQA).

(h) The chemical composition of the rotenone formulation has not changed significantly (based on analytical chemical scans to be performed by the DFG on each formulation lot to be used) in such a way that potential hazards may be present which have not been addressed.

(i) Plans for disposal of dead fish are adequate to protect water quality.

The Discharger has provided project-specific information required by the MOU. The Water Board has considered this information and determined that this project meets Basin Plan conditions and eligibility criteria for DFG rotenone projects. On that basis, the project qualifies for the variance, established in the Basin Plan, from meeting water quality objectives that would otherwise apply. The project is subject, however, to specific water quality objectives for rotenone use contained in the Basin Plan, and to numeric criteria for priority pollutants contained in the California Toxics Rule, unless the project qualifies for an exception.

15. Consideration of Alternatives to Chemical Treatment

The Discharger has considered alternatives to chemical treatment, and determined that rotenone treatment is the superior option to ensure the complete eradication of non-native fish necessary to reestablish the Paiute Cutthroat Trout for this project. Recent research indicates that gill-netting may be an effective non-chemical alternative to rotenone treatment in eradicating fish from certain shallow mountain lakes. The Discharger considered gill-netting as a possible alternative to using rotenone in Tamarack Lake, a shallow lake that is part of the project area. The Discharger shall employ gill nets to survey the lake and if no fish are found, Tamarack Lake will be determined to be fishless. However, the Discharger has determined that finding a single fish represents a significant risk to the recovery and serves as an indicator that additional fish could be present. A single fish has the ability to move downstream into the recovery area and hybridize with the Paiute cutthroat trout. Areas of the Sierra Nevada where gill netting has been successful are those where the risk of hybridization does not exist (e.g. removing fish for the purposes of amphibian recovery). Leaving a fish in these settings does not adversely affect recovery of amphibians. Should the additional surveys and gill netting (conducted in at least 2009 and 2010) indicate that there are fish still present in Tamarack Lake, the Discharger has determined chemical treatment of the lake is necessary.

Water draw-down (followed by winter freezing) was also considered as a possible alternative to rotenone for Tamarack Lake, but was determined to be impracticable due to the large volume of water that would need to be removed. The Discharger has previously collaborated with the U.S. Forest Service on a siphon project to drawdown an alpine lake to facilitate a complete lake freeze. The project required several hundred feet of siphon hose for a significantly smaller lake and the siphon

meeting the CTR priority pollutant criteria/objectives for resource or pest management projects conducted by public entities. In order to qualify for an exception from meeting priority pollutant standards, a public entity must fulfill the requirements listed in section 5.3. Among other requirements, entities seeking an exception to complying with water quality standards for priority pollutants must submit California Environmental Quality Act (CEQA, Public Resources Code Section 21000, et seq.) documents.

The Discharger prepared an EIS/EIR in compliance with CEQA. The Silver King Creek rotenone project meets the qualifications for a categorical exception from meeting CTR priority pollutant criteria/objectives, and an exception is granted in the provisions of this permit. Therefore, effluent and receiving water monitoring for priority pollutants, as described in the State Implementation Policy, is not required for this project.

In addition, Water Board staff reviewed confidential proprietary information provided by the manufacturers of the rotenone formulations to be used for this project, and found no evidence that the formulations contain ingredients that include priority pollutants

19. California Environmental Quality Act (CEQA) Compliance

This action to adopt an NPDES permit is exempt from the provisions of the California Environmental Quality Act (Public Resources Code Section 21000, et seq.) in accordance with Section 13389 of the California Water Code.

While adoption of this NPDES permit by the Water Board is exempt from CEQA, Section 5.3 of the State Implementation Policy requires public entities requesting exceptions from meeting CTR priority pollutant criteria/objectives to submit CEQA documentation to the Water Board for approval. In 1994, the Discharger completed a Programmatic Environmental Impact Report entitled *Rotenone Use for Fisheries Management, July 1994*. In addition, in 2009 the US Fish and Wildlife Service and the Discharger completed a joint NEPA/CEQA environmental document "Paiute Cutthroat Trout Recovery Project, Silver King Creek, Humboldt-Toiyabe National Forest, Alpine County, California," and filed a CEQA Notice of Determination for the project with the Governor's Office of Planning and Research on June 8, 2009 (*anticipated*). This CEQA documentation has been submitted to the Water Board and Water Board hereby finds it in accordance with CEQA (*anticipated*).

When an EIR has been prepared for a project, a Responsible Agency shall not approve the project as proposed, pursuant to CEQA Guidelines, Section 15096(g)(2), if the agency finds any feasible alternative or feasible mitigation measures within its powers that would substantially lessen or avoid any significant effect the project would have on the environment. The Water Board's adoption of this NPDES permit is exempt from CEQA, but the Water Board is nonetheless proceeding as though it were a CEQA Responsible Agency. The Water Board has evaluated the Paiute Cutthroat Trout Restoration Project EIS/EIR for potentially significant impacts to water quality, concurs in the EIS/EIR's findings regarding significant water quality-related effects, and finds that there are no additional feasible, less-damaging alternatives or mitigation measures that would accomplish

concentration required for eradication of non-native salmonids; 2) sufficient degradation of rotenone has occurred before the area is opened to the public; and 3) rotenone toxicity does not occur outside the project area. Water samples will be analyzed for rotenone and rotenolone concentrations, as well as for volatile organic compound and semi-volatile organic compound concentrations. Treatment time will be minimized by limiting the duration of rotenone activity to the shortest time period needed to meet the fish removal objective. Direct effects from the treatment on water quality will be confined to the project area.

20. Nondegradation/Antidegradation

The Water Board has considered antidegradation pursuant to 40 CFR section 131.12 and State Board Resolution No. 68-16. Discharges must be consistent with both the State nondegradation and federal antidegradation policies. The conditions of this permit require compliance with water quality objectives for rotenone projects contained in the Basin Plan. The application of rotenone and potassium permanganate may temporarily degrade waters of exceptional quality. The degradation will be temporary, and it is in the best interest of the people of the State. The Basin Plan states:

> *The temporary deterioration of water quality due to the use of rotenone by the DFG is justifiable in certain situations. The Water Board recognizes that the State and federal Endangered Species Acts require the restoration and preservation of threatened and endangered species . . . These resources are of important economic and social value to the people of the State, and the transitory degradation of water quality and short-term impairment of beneficial uses that would result from rotenone application is therefore justified provided suitable measures are taken to protect water quality within and downstream of the project area.*

Therefore, this Permit is consistent with the State non-degradation and federal anti-degradation policies.

21. Species Composition Considerations and Non-degradation/Anti-degradation

The Basin Plan rotenone policy requires that, within two years following the last treatment for a specific project, a fisheries biologist or related specialist from DFG must assess the condition of the treated waters, and certify in writing whether all applicable beneficial uses have been restored. Pursuant to the MOU, that assessment must consider the condition of fish and invertebrate populations in the affected waters.

The Basin Plan water quality objectives for rotenone include a species composition objective that states:

> "Where species composition objectives are established for specific water bodies or hydrologic units, the established objective(s) shall be met for all non-target aquatic organisms within one year following rotenone treatment [or within one year following the final rotenone application for multi-year projects]."

the discharge of potassium permanganate shall be discernible within or downstream of project boundaries.

2. Pesticides

   a. The concentration of naphthalene outside of project boundaries shall not exceed 25 µg/L at any time.

   b. The concentration of rotenone, rotenolone, trichloroethylene (TCE), xylene, or acetone (or potential trace contaminants such as benzene or ethylbenzene) outside of project boundaries shall not exceed the detection levels[10] for these respective compounds at any time.

   c. After a two-week period has elapsed from the date that rotenone application was completed, no chemical residues resulting from the treatment shall be present at detectable levels within or downstream of project boundaries.

   d. No chemical residues resulting from rotenone treatments shall exceed detection levels in ground water at any time.

3. Toxicity

   Chemical residues resulting from rotenone treatment must not exceed the limitations listed above for pesticides.

B. Application Specifications

1. The Discharger must use only the rotenone formulations which it has previously identified and characterized for this project (specifically, carrier-free powdered rotenone, Nusyn-Noxfish, and CFT Legumine™.)

2. Rotenone applications must be made in accordance with label specifications.

3. Applications must be supervised by a licensed applicator in accordance with regulations of the Department of Pesticide Regulation.

4. Applications of rotenone and potassium permanganate must be made in compliance with the MOU and the project EIS/EIR.

5. The Discharger must implement the Spill Contingency plan submitted with the 2009 Rotenone Application.

6. The Discharger must conduct macroinvertebrate surveys according to protocols described in Attachment 2 of the Monitoring and Reporting Program, including pre- and post- application surveys.

[10] "Detection level" is defined as the minimum level that can be reasonably detected using state-of-the-art equipment and methodology.

4. Mechanical disturbance of soils (for example, to bury fish or construct earthen spill containment berms) in wetland or riparian habitats is prohibited.

II. PROVISIONS

A. Standard Provisions for NPDES Permits

The Discharger must comply with the "Standard Provisions for NPDES Permits," (Attachment B), which is made a part of this Order.

B. Monitoring and Reporting

1. Pursuant to California Water Code Section 13383, the Discharger shall comply with Monitoring and Reporting Program No. R6T-2009-**(TENTATIVE)**, which is made a part of this Order, and with any revisions thereto.

2. The Executive Officer may require additional monitoring pursuant to California Water Code Section 13267, as necessary, to establish the recovery of aquatic macroinvertebrate communities following treatment, or to ensure compliance with other requirements and conditions of this NPDES Permit.

C. General Provisions for Monitoring and Reporting

The Discharger must comply with the "General Provisions for Monitoring and Reporting," (Attachment C), which is made a part of this Order.

D. Expiration

This Order expires five years from the date of its adoption, on July 8, 2014.

III. EXCEPTION FROM PRIORITY POLLUTANT CRITERIA/OBJECTIVES GRANTED

A categorical exception from meeting priority pollutant criteria/objectives is hereby granted subject to the provisions of State Implementation Policy section 5.3. The Discharger shall comply with all provisions of section 5.3 that are applicable to categorical exceptions.

I, Harold J. Singer, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Lahontan Region, on July 8, 2009.

_____
HAROLD J. SINGER
EXECUTIVE OFFICER

Attachments: A. Project Location Map
B. Standard Provisions for NPDES Permits
C. General Provisions for Monitoring and Reporting

ATTACHMENT B

STANDARD PROVISIONS FOR NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMITS

1. The permittee must comply with all of the terms, requirements, and conditions of this NPDES Permit. Any violation of this Permit constitutes violation of the Clean Water Act (CWA), its regulations and the California Water Code, and is grounds for enforcement action, permit termination, permit revocation, and reissuance, denial of an application for permit reissuance; or a combination thereof.

2. The permittee shall comply with effluent standards or prohibitions established under 307(a) of the CWA for toxic pollutants within the time provided in the regulations that establish these standards or prohibitions, even if this Permit has not yet been modified to incorporate the requirement. [40 CFR 122.41(a)(l)]

   The California Water Code provides that any person who violates a Waste Discharge Requirement (same as permit condition), or a provision of the California Water Code, is subject to civil penalties of up to $1,000 per day or $10,000 per day of violation, or when the violation involves the discharge of pollutants, is subject to civil penalties of up to $10 per gallon per day or $20 per gallon per day of violation; or some combination thereof, depending on the violation, or upon the combination of violations.*

   Violations of any of the provisions of the NPDES program, or of any of the provisions of this Permit, may subject the violator to any of the penalties described herein, or any combination thereof, at the discretion of the prosecuting authority; except that only one kind of penalty may be applied for each kind of violation.*

3. The CWA provides that any person who violates a Permit condition implementing Sections 301, 302, 306, 307, or 308 of the CWA is subject to a civil penalty not to exceed $10,000 per day of such violation. Any person who willfully or negligently violates Permit conditions implementing these Sections of the CWA is subject to a fine of not less than $2,500, nor more than $25,000 per day of violation, or by imprisonment for not more than one year, or both. [40 CFR 122.41(a)(2)]

4. If the permittee wishes to continue an activity regulated by this Permit after the expiration date of this Permit, the permittee must apply for and obtain a new Permit. [40 CFR 122.41(b)]

5. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this Permit. [40 CFR 122.41(c)]

6. The permittee shall take all reasonable steps to minimize or prevent any discharge that has a reasonable likelihood of adversely affecting health or the environment. [40 CFR 122.41(d)]

7. The permittee shall, at all times, properly operate and maintain all the facilities and systems of treatment and control (and related appurtenances) that are installed or used by the permittee to achieve compliance with this Permit.

   Proper operation and maintenance includes adequate laboratory controls, and appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities, or similar systems that are installed by a permittee only when necessary to achieve compliance with the conditions of this Permit. [40 CFR 122.41(e)]

(e) The CWA provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device, or method required to be maintained under this Permit shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than six months per violation, or by both.

[40 CFR 122.41(j)]

13. All applications, reports, or information submitted to the Regional Board shall be signed and certified in accordance with 40 CFR 122.22 [40 CFR 122.41(k)(1)]

14. The CWA provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this Permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than six months per violation, or by both. [40 CFR 122.41(k)(2)]

15. Reporting requirements:

(a) The permittee shall give advance notice to the Regional Board, as soon as possible of, any planned physical alterations, or additions to the permitted facility.

(b) The permittee shall give advance notice to the Regional Board of any planned changes in the permitted facility or activity that may result in noncompliance with permit requirements.

(c) This Permit is not transferable to any person, except after notice to the Regional Board. The Regional Board may require modification, or revocation and reissuance of the Permit to change the name of the permittee, and incorporate such other requirements as may be necessary under the CWA.

(d) Monitoring results shall be reported at the intervals specified elsewhere in this Permit.

(i) Monitoring results must be reported in a Discharge Monitoring Report (DMR).
(ii) If the permittee monitors any pollutant more frequently than required by this Permit using test procedures approved under 40 CFR Part 136 or as specified in this Permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR.
(iii) Calculations for all limitations that require averaging of measurements shall utilize an arithmetic mean unless otherwise specified in this Permit.

(e) Report of compliance or noncompliance with, or any progress reports on interim and final requirements contained in any compliance schedule of this Permit shall be submitted no later than 14 days following each schedule date.

(f) Twenty-four hour reporting.

(i) The permittee shall report any noncompliance that may endanger health or the environment to the Regional Board. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within five days of the time the permittee

careless or improper action. A permittee that wishes to establish the affirmative defense of an upset in an action brought for noncompliance shall demonstrate, through signed, contemporaneous operating logs, or other relevant evidence that:

(a) an upset occurred and that the permittee can identify the cause(s) of the upset;

(b) the permitted facility was being properly operated at the tine of the upset;

(c) the permittee submitted notice of the upset as required in paragraph 15(f) above; and

(d) the permittee complied with any remedial measures required under paragraph 7.

No determination made before an action for noncompliance, such as during administrative review of claims that noncompliance was caused by an upset; is final administrative action subject to judicial review.

In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof. [40 CFR 122.41(n)]

18. All existing manufacturing, commercial, mining, and silvicultural dischargers must notify the Regional Board as soon as they know or have reason to believe:

(a) that any activity has occurred or will occur that would result in the discharge of any toxic pollutant that is not limited in this Permit, if that discharge will exceed the highest of the following "notification levels:"

(i) One hundred micrograms per liter (100 µg/L);
(ii) Two hundred micrograms per liter (200 µg/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 µg/L) for 2-4dinitrophenol and 2-methyl-4-b-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;
(iii) Five (5) times the maximum concentration value reported for that pollutant in the Permit application; or
(iv) The level established by the Regional Board in accordance with 40 CFR 122.44(f).

(b) that they have begun or expect to begin to use or manufacture as an intermediate or final product or byproduct any toxic pollutant that was not reported in the Permit application. [40 CFR 122.42(a)]

* This paragraph was added or modified by the State Water Quality Control Board to the California Water Code.

ATTACHMENT "C"
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

GENERAL PROVISIONS
FOR MONITORING AND REPORTING

1. SAMPLING AND ANALYSIS

a. All analyses shall be performed in accordance with the current edition(s) of the following documents:

i. Standard Methods for the Examination of Water and Wastewater

ii. Methods for Chemical Analysis of Water and Wastes, EPA

b. All analyses shall be performed in a laboratory certified to perform such analyses by the California State Department of Health Services or a laboratory approved by the Regional Board Executive Officer. Specific methods of analysis must be identified on each laboratory report.

c. Any modifications to the above methods to eliminate known interferences shall be reported with the sample results. The methods used shall also be reported. If methods other than EPA-approved methods or Standard Methods are used, the exact methodology must be submitted for review and must be approved by the Regional Board Executive Officer prior to use.

d. The discharger shall establish chain-of-custody procedures to insure that specific individuals are responsible for sample integrity from commencement of sample collection through delivery to an approved laboratory. Sample collection, storage, and analysis shall be conducted in accordance with an approved Sampling and Analysis Plan (SAP). The most recent version of the approved SAP shall be kept at the facility.

e. The discharger shall calibrate and perform maintenance procedures on all monitoring instruments and equipment to ensure accuracy of measurements, or shall insure that both activities will be conducted. The calibration of any wastewater flow measuring device shall be recorded and maintained in the permanent log book described in 2.b, below.

f. A grab sample is defined as an individual sample collected in fewer than 15 minutes.

g. A composite sample is defined as a combination of no fewer than eight individual samples obtained over the specified sampling period at equal intervals. The volume of each individual sample shall be proportional to the discharge flow rate at the time of sampling. The sampling period shall equal the discharge period, or 24 hours, whichever period is shorter.

iv. In the case of a municipal, state or other public facility, by either a principal executive officer, ranking elected official, or other duly authorized employee.

e. Monitoring reports are to include the following:

i. Name and telephone number of individual who can answer questions about the report.

ii. The Monitoring and Reporting Program Number.

iii. WDID Number.

f. Modifications

This Monitoring and Reporting Program may be modified at the discretion of the Regional Board Executive Officer.

4. NONCOMPLIANCE

Under Section 13268 of the Water Code, any person failing or refusing to furnish technical or monitoring reports, or falsifying any information provided therein, is guilty of a misdemeanor and may be liable civilly in an amount of up to one thousand dollars ($1,000) for each day of violation.

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

MONITORING AND REPORTING PROGRAM NO. R6T-2009-(TENT)
WDID NO. 6A020405008
NPDES NO. CA0103209

FOR

CALIFORNIA DEPARTMENT OF FISH AND GAME
PAIUTE CUTTHROAT TROUT RESTORATION PROJECT

ALPINE COUNTY

I. MONITORING PROGRAM GOALS

A. To ensure compliance with receiving water limits established in Water Board Order R6T-2009-(TENT).
B. To establish the nature and duration of rotenone treatment impacts to benthic macroinvertebrate populations, and verify that those populations and beneficial uses have been restored following treatment.
C. To detect, capture, and relocate out of the project area any threatened, endangered, sensitive, candidate or rare amphibians prior to rotenone treatment.

II. DETERMINATION OF PROJECT BOUNDARIES

The project boundaries for rotenone projects are defined, pursuant to the Basin Plan, as encompassing the treatment area, the detoxification area, and the area downstream of the detoxification station up to a thirty-minute in-stream travel time.

The California Department of Fish and Game (DFG, the Discharger) shall estimate the distance from the detoxification station to the downstream thirty-minute travel time endpoint, based on measurements of stream flow and/or average velocities, prior to commencement of rotenone application. This endpoint will define the downstream extremity of the project boundaries. The approximate location of the project boundaries shall be identified and recorded, along with any calculations used in making the determination.

III. SURFACE WATER MONITORING

A. Temperature

Water temperature shall be measured and recorded whenever samples are collected for chemical analysis (according to the schedule described below), at the corresponding monitoring station and at the same time as sample collection.

Semi-Volatile Organic Compounds (SVOCs)	USEPA 8270	µg/L	Grab
Di(ethylene glycol) ethyl ether (DEE)	modified USEPA 8015	µg/L	Grab
1-methyl1-2-pyrrolidone (MP)	modified USEPA 8015	µg/L	Grab

[1] Method: Dawson, V., P. Harmon, D. Schultz, and J. Allen. 1983. Rapid method for measuring rotenone in water at piscicidal concentrations. *Trans. Amer. Fish. Soc. 112:725-728*

E. Sampling Schedule

Samples shall be collected for analysis according to the schedule indicated in the following table. Pre-treatment samples shall be collected not more than 24 hours prior to application of rotenone. Sample timing may need to be changed depending upon stream flow conditions and logistics on a given year. Changes in sampling protocol will be mutually agreed upon between the Discharger and the Water Board in advance of sample collection. Stations in Tamarack Lake will only be sampled if the lake is chemically treated.

Analysis	Site	Pre-Treatment	During Treatment	Day After Treatment	Weekly Post-Treatment
Rotenone & Rotenolone	MSKC1	X	every two hours	X	X[2]
	MSKC2	X	every two hours	X	
	MSKC3		twice		
	MSKC5		twice		
	MSKC7		twice		
	MTLC1		twice		
	MTC1		twice		
	MTC2		twice		
	MTL1	X		X	X
	MTL2	X		X	X
	MTL3	X		X	X
VOC/semiVOC	MSKC1	X	twice		X[2]
	MSKC2	X	twice		

Discharger shall submit a draft map of no treatment areas to the Water Board one day prior to treatment. By November 1 of each year of any chemical treatment, the Discharger shall submit a final map certifying areas that received no rotenone application.

II. REPORTING

A. The Discharger must submit a monitoring report to the Regional Board within 60 days of project completion. The report shall include the following:

1. Data required by this monitoring and reporting program;
2. Approximate volumetric flow rate of each creek discharged to on application day;
3. Volume of rotenone product used, by location applied;
4. Amount of potassium permanganate used;
5. Summary of project; and
6. Evaluation of project success.

In reporting the monitoring data, the Discharger shall arrange the data in tabular form so that the date, the constituents, and the concentrations are readily discernible. The data shall be summarized in such a manner to clearly illustrate compliance with Board Order R6T-2009-(TENT).

B. The monitoring report must include a cover letter containing the information and certification in the Monitoring and Reporting Cover Letter form (Attachment 3), which is hereby made a part of this Monitoring and Reporting Program.

C. The Discharger shall clearly identify in the monitoring report any violations of Board Order R6T-2009-(TENT), and submit a statement of corrective actions taken or proposed, including a timetable for implementation.

III. The Discharger shall implement the above monitoring program immediately upon the commencement of the initial discharge covered by the general Order. This Monitoring and Reporting Program may be modified by the Executive Officer for individual discharges.

Ordered by:_____ Dated:_____
HAROLD J. SINGER
EXECUTIVE OFFICER

Attachments: 1. Map—Location of monitoring stations
2. Silver King Creek Macroinvertebrate Monitoring, August 2007-2015
3. Monitoring Report Cover Letter form
4. 2007 Sierra Nevada Fish and Amphibian Inventory Data Sheet Instructions
5. Tamarack Lake Fishless Status Monitoring

Attachment 2

Silver King Creek Macroinvertebrate Monitoring August 2007-2015

Background

The California Department of Fish and Game and the U.S. Fish and Wildlife Service propose to treat Silver King Creek basin with rotenone during the late summer of 2009, 2010, and possibly 2011. The goal of this project is to restore Paiute cutthroat trout (*Oncorhynchus clarkii seleniris*), a federally listed threatened species, to its historic habitat.

While rotenone is intended to eradicate non-native trout, it is also toxic to some aquatic macroinvertebrates. Rotenone was first used in the Silver King Creek basin in 1964, and on various occasions and locations up to 1993. Macroinvertebrate sampling within the basin began in 1984 and has occurred periodically up to 2007.

This monitoring study differs from the June 15, 2003, Interagency Study Proposal in that it incorporates more sampling stations throughout the basin as well as additional "control" and "treatment" sites. The sampling methodology is also changed to allow for additional analyses such as the River Invertebrate Prediction and Classification System (RIVPACS) analysis model (Hawkins et al. 2000).

Objectives

The primary objectives of this study are to: 1) analyze changes in macroinvertebrate assemblages and taxa from the use of rotenone during Paiute cutthroat trout recovery activities, 2) collect and identify taxa from the Silver King Creek basin, and 3) reestablish historic collection sites in selected streams.

Study Design

Twenty-three quantitative and 5 qualitative sampling site locations were established during August 2007 (Table 1). This study design differs from the June 15, 2003, Interagency Study Proposal in that it incorporates more sampling stations throughout the basin as well as additional "control" and "treatment" sites (nine pairs) (Figures 1 and 2). Five qualitative sampling sites were established within the area to be treated to increase the likelihood of collecting taxa with low relative abundances, i.e. rare taxa (Figure 3). The sampling methodology is also changed to allow for additional analyses.

Past analyses to evaluate the effects of rotenone on aquatic biota are hampered by the lack of data on aquatic invertebrate assemblages prior to the use of rotenone (Vinson and Vinson 2007). This monitoring effort includes five quantitative sampling sites (SKC Site 1 & 2, Tamarack Sites 1-3) and 3 qualitative sampling sites (SKC Site 1, Tamarack Sites

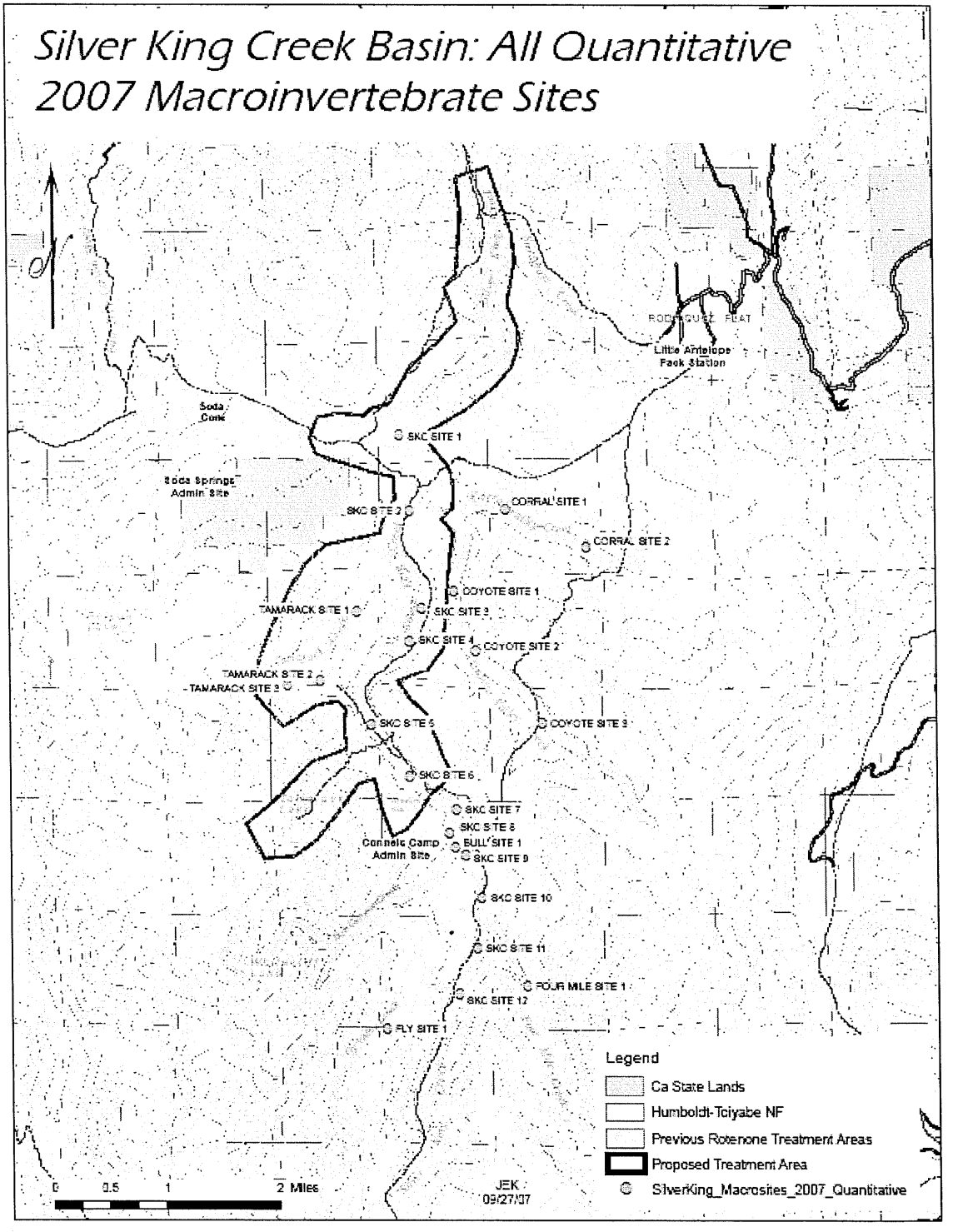


Figure 1. Quantitative sampling sites within the Silver King Creek basin.

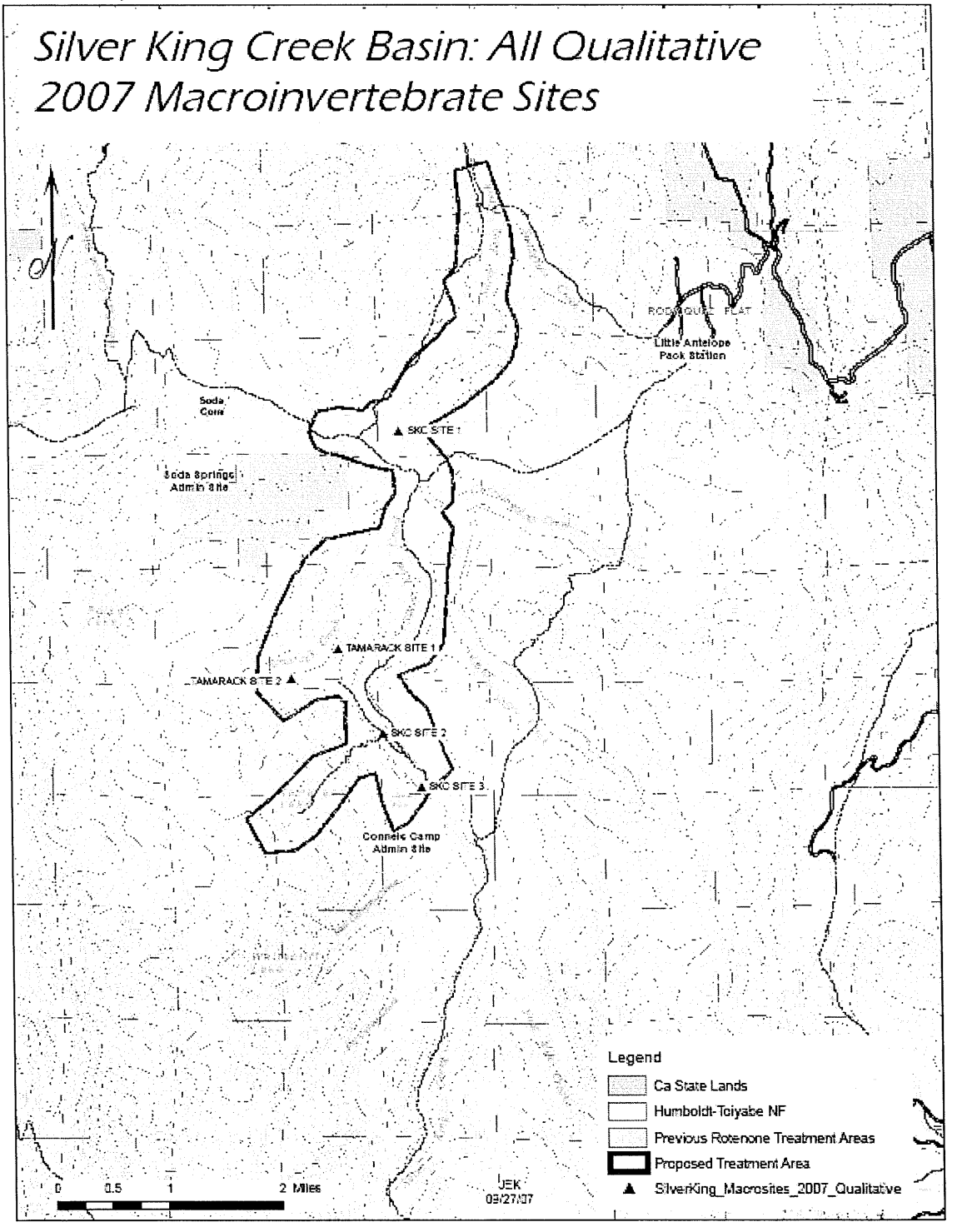


Figure 3. Qualitative sampling sites within the Silver King Creek basin.

Table 2. Continued.

Taxon or Taxa group	BugLab's Current Standard Taxonomic Level	Northwest Bioassessment Work Group Minimum Standard Taxonomic Effort
Arthropoda		
Crustacea		
Amphipoda	Genus/species	Genus
Isopoda	Genus	Genus
Collembola	Order	
Insecta		
Coleoptera	Genus/species	Genus
Except Curculionidae, Heteroceridae, Ptiliidae	Family	Family
Diptera		
Atherceridae	Genus/species	Genus
Blephariceridae	Genus/species	Genus
Ceratopogonidae	Genus	Subfamily
Chaoboridae	Genus	
Chironomidae	Subfamily	Genus
Culicidae	Genus	
Deuterophlebiidae	Genus/species	Genus
Dixidae	Genus	Genus
Dolichopodidae	Family	Family
Empididae	Genus	Genus
Ephydridae	Family	Family
Muscidae	Family	Family
Pelecorhynchidae	Genus	Genus
Psychodidae	Genus	Genus
Ptychopteridae	Genus	Genus
Sciomyzidae	Family	
Simuliidae	Genus	Genus
Stratiomyidae	Genus	Genus
Tabanidae	Genus	Family
Tanyderidae	Genus	Genus
Thaumaleidae	Genus	Genus
Tipulidae	Genus	Genus
Ephemeroptera	Genus/species	Genus
Ephemerellidae	species	species
Hemiptera	Genus/species	Genus

Statistical analyses

An equal number (nine pairs) of control and treatment sites will sampled before and after the treatment with rotenone. Pre-treatment sampling will occur in 2007, 2008, and 2009; post-treatment monitoring will be conducted during mid-August the first year after treatment, 3 years post-treatment, and 5 years post-treatment. This will allow for a BACI (Before-After-Control-Impact) analysis to be used to detect treatment effects to biological metrics. BACI analyses will follow 2 methodologies, designed to detect both short and long-term impacts. The first method is the standard BACI, where the time scale is constrained to the sampling period immediately before and after treatment. A 2-way ANOVA on selected metrics (e.g. abundance, tolerance values) with Time (Before/After) and Site (Control/Impact) is then performed, with rotenone effects assessed using the interaction term (Green 1979). Long-term effects will be analyzed using a BACIPS (Before-After-Control-Impact Paired Series) (Stewart-Oaten 1996). In this, an average metric value for each sampling period for Control sites and Treatment sites are determined, and the difference between the averages is the response variable analyzed statistically. The differences in pre-treatment versus post-treatments are then analyzed using a basic *t*-test. Metrics to be analyzed may also include aquatic invertebrate abundance and taxa richness (genera) which Vinson and Vinson 2007 suggest that differences would be detectable following a rotenone treatment. ANOVA may be also used to evaluate differences in aquatic invertebrate assemblage measures between pre-treatment and post-samples to detect treatment effects. Simple graphs of before and after comparisons will be used to evaluate differences in invertebrate assemblage measures and diversity indices between pre-treatment and post-treatment periods (Vinson and Dinger 2006).

RIVPAC analysis will also be conducted. This analysis allows for the prediction of what taxa should occur at a site in the absence of anthropogenic actions and factors in the probability of occurrences for all individual.

Accumulation curves will be used to provide information on the adequacy of sampling and on the relative number of taxa that may be present but are yet uncollected. These methods will be used following treatment to evaluate assemblage recovery. Rare taxa, (those whose individual abundances are less than 1% of the total sample abundance) will be identified in pre-treatment sampling and tracked post-treatment to detect treatment effects. Of particular interest will be sampling sites, Tamarack 1-3 and Silver King 1 & 2, which are areas that haven't been treated with rotenone.

Historic Site monitoring

Long-term sampling sites have been reestablished on Fly Valley Creek, Four-mile Creek, Bull Canyon, and at upstream historic sites in Silver King Creek. Although this monitoring study uses a different sampling design from those used historically, sampling these sites could provide additional information on historic assemblages. The Fly Valley and Four-mile creeks sites are in areas that were never chemically treated and will not be treated.

Date _____

Attachment 3
Monitoring Report Cover Letter

California Regional Water Quality Control Board
Lahontan Region
2501 Lake Tahoe Boulevard
South Lake Tahoe, CA 96150

Facility Name: _____

_____

Address: _____

_____

_____

_____

Contact Person: _____

Job Title: _____

Phone: _____

Email: _____

WDR/NPDES Order Number: _____

WDID Number: _____

Type of Report (circle one): **Monthly Quarterly Semi-Annual Annual Other**

Month(s) (circle applicable month(s)*: **JAN FEB MAR APR MAY JUN**

JUL AUG SEP OCT NOV DEC

***annual Reports** (circle the first month of the reporting period)

Year: _____

Violation(s)? (Please check one): _____**NO** _____ **YES***

***If YES is marked complete a-g (Attach Additional information as necessary)**

a) Brief Description of Violation: _____

_____

_____

_____

_____

b) Section(s) of WDRs/NPDES Permit Violated: _____

_____

_____

_____

2007 Sierra Nevada Fish and Amphibian Inventory Data Sheet Instructions
Version 2.3 May-15-07

California Department of Fish & Game
Fish/Amphibian Survey Protocols

Overview

Fill out a separate data sheet (substitute "Palm entry" for "data sheet" as necessary) for **every** lake and pond that has a Site ID, regardless of how un-lake like the site is. If the site is dry, frozen, part of another sampled water body, or is a widening of a stream (i.e., there is a current flowing through the site), indicate why a full datasheet was not filled out on the map portion of the datasheet or the notampled field and comment field of survey main (e.g., "pond was dry"). Some data subforms will still need to be filled out in the Palm unit (see below). If you encounter ponds not shown on the 7.5' maps, fill out a data sheet if they contain fish, amphibians, and/or fairy shrimp. Meadows, marshes, and spring seeps should always be surveyed, even if they do not have Site IDs. When you visit non-lake habitat such as marshes that contain extensive ponded water, complete a single survey for the entire area. It is critical that all relevant portions of each data sheet be filled out, and that non-relevant portions be indicated as such, not simply left blank. Remember, if the data sheet is improperly filled out, the visit was a complete waste of time and money.

When you complete surveys in habitats that do not contain ponded water (e.g., streams), record the start and end UTM coordinates in the amphibian/reptile visual survey section and complete all other pertinent sections. Many stream sections that will be surveyed are associated with other Site IDs (e.g., 200 m of each inlet and outlet) and the survey data should be entered on the associated Site ID's data sheet. Record all observations in ball point pen. Keep data notebooks and otoliths in separate Ziplock bags to prevent labels from being erased by leaking alcohol.

Recording Numbers: Use the dot-line method for recording the number of "hits" in fields that require a count (4 hits: ⠉; 8 hits: ⠛; 10 hits: ⠻), instead of the more typical four vertical lines and a slash. The dot-line method is much more space-efficient and is easier to read. In addition to categorizing the substrate type at each spot, record the presence or absence of aquatic vegetation at each spot (record hits using the dot-line method).

General Lake Description / Survey Main

Site ID: This is a *critical* number, as it will be used to link the data sheet to a particular body of water and to identify all samples. This ID is written on the 7.5' maps available for crews to take into the field. Check the Site ID carefully before recording it on the data sheet. If you encounter a lake or pond that is not shown on the 7.5' map or a marsh, meadow or spring seep that does not have a Site ID, its Site ID will be the number of the **nearest lake or pond that has a Site ID** plus a decimal place identifier (e.g., 70377.01). Additional Site ID's for nearby unnumbered lake features will be made using consecutive numbers (e.g., 70377.02, 70377.03).

Location: This description should **always** be provided, and must be detailed enough to allow someone not familiar with the area to pinpoint the lake on a topographic map. This information is particularly critical for unnamed lakes because the GPS point is the only other reference for the location of the water body. Do not leave this space blank, no matter how obvious the lake feature is. At a minimum, give the distance and the compass direction from the site to two nearby prominent named geographical features (e.g., lakes, peaks, etc.). Lake and peak names, distances, and compass directions should be taken from 7.5' maps. Palm - Use the survey main comment field to note location.

Date: Write as month-day-year (Aug-10-01) and always use the three letter abbreviation for month. Palm- ensure this field auto-populates correctly. If your palm's date is incorrect this field will also be incorrect. If entering data in a palm after the survey was conducted, be sure to change the value of this field to the appropriate survey date BEFORE opening any subforms.

Lake name: Lake names generally originate from the 7.5' topo map. However, CDFG has also implemented its own naming system for the stocking program. Field crews should have a pre-generated field lake checklist with the proper CDFG lake name and corresponding Site ID. Use this list to populate the Lake name field.

waterbody, will receive a full survey under the Lake ID of the larger site. Palm – fill out a survey main for the site but indicate in the comments that the full data set is associated with a different site and list the site ID.

Planning Watershed: The watershed name for all lakes is given on the "Lakes Checklist." Do not use the name of the outlet creek given on the 7.5' map as the drainage name, as this may not be a complete description.
Palm - The watershed name should be auto-populated for all pre-identified site IDs (i.e. those ending in .00). If a new site is being surveyed, use your survey map to identify which planning watershed the new site is located in, and pick the appropriate watershed name from the picklist.

County: Record the county (from 7.5' map) in which the lake feature lies.

Elevation: Record the elevation from the 7.5' map, or a calibrated altimeter (such as the altimeter feature in the Garmin eTrix Vista GPS). When using the map look for labeled contour lines to determine contour interval distance and units. Be aware that maps generated in the office by GIS software that span multiple 7.5' quads may display intervals in both meters and feet. The lake elevation is the average of the contour line below the lake and the contour line above the lake. Thus, if a lake is between the 9860' contour and the 9900' contour, the lake elevation should be recorded as 9880'. A common mistake is to assume that the proximity of a lake to a contour line indicates that the elevation of the lake is close to the value of that contour line. The horizontal distance between two points on a topographic map bears no relationship to the vertical distance between those same two points. Record the units used (m or ft).

If the lake has a water level elevation (i.e. WL 9832), use this number in the elevation field (note- water level elevations are a good source to calibrate an altimeter).

Avoid using the GPS estimated elevation because this number is highly inaccurate (+/- 200meters in many cases).

UTM Coordinates: This is a pair of numbers that are basically x and y coordinates. In our area, they are North and East. These numbers need only be obtained for lakes not shown on the 7.5' maps or for those lakes lacking a Site ID. Use a GPS unit to obtain the UTM coordinates. Also record the UTM zone that you are in. **Make sure your GPS is setup in UTM NAD83**. These coordinates are critical as they will be used to map the lake.

Topographic map: Record the name of the 7.5' topographic map (or "quad") that contains the lake feature. These are listed in the legend on our CDFG navigation maps. Palm- not used in Palm.

Maximum lake depth: Measure maximum lake depth with the Speedtech SM-5 Depthmate Portable Sounder. Do not spend inordinate amounts of time sounding every part of the lake to find exactly the deepest part. By sounding the deepest-looking piece of the lake, you will quickly get a feel for where the deepest spot actually is. Precise measurements of "maximum depth" are not very important in large deep lakes. However, in shallow lakes (< 5 m) a precise depth (± 0.5 m) is very important. Plan to take maximum depths when setting or retrieving gill nets, but the data must still be collected even when nets are not set. **This data field was ignored too often in the past but is one of the more important data for determining future management options!** Enter this value on the Fish Data Form at the top of page 3, or at the bottom on page 2 if no gill net fish survey was completed for a site. In the Palms the Max Depth field is located in the Fish Header Subform.

Maximum lake depth should be measured even when field crews are not equipped with a depth sounder. There are many methods to improvise and collect depth measurement, but the simplest is often a known length of cord and a rock.

Team Members: Use complete names. Palm - All crew involved in data collection should be recorded in the Surveyors Subform. The VES crew should be listed in the amphibian surveyours subform.

Lake Characteristics

The habitat characterization is perhaps the most subjective of the measurements made using this protocol., and we hope to reduce the potentially high observer bias by stressing the need for survey consistency. In other words, it is important to practice the protocol, calibrate visual estimates with real measurements, check each other's data, and maintain consistent survey methods.

Palm – It is very important that palm users realize there is no inherent method of tracking barrier photo data to a specific tributary. Thus, ALWAYS assign a number for each tributary (i.e Inlet 2, or Outlet 1) even if there is only one tributary. It is important to make sure the same tributary number is listed on the barrier photo subform. Also, tributary numbers must be recorded on lake sketches.

Tributary GPS points: Record a GPS point where each tributary joins the lake. Also record a GPS point at the end of your tributary survey. This will help to match inlet/outlet data to the correct tributary.

Tributary number: Record number assigned for each tributary (i.e. Inlet 1, Inlet 2, or Outlet 1). This same number is to be recorded on lake sketch and included in barrier information, so that the correct barrier can be associated with the correct tributary.

Width and depth of inlets & outlets: While walking the lake perimeter, record the average width and depth at bank full of each tributary, even if dry. Inlets generally are widest at the point at which they enter the lake, so obtain the average width and depth upstream of this point. If there are no inlets, circle "no inlets". If inlet is dry enter "Dry" and continue to survey for barriers and amphibians. If there are no outlets, circle "no outlets". If outlet is dry enter "Dry" and continue to survey for barriers and amphibians.
Palm – if there are no inlets check "Inlets NOT Present". If there are no outlets check "Outlets NOT Present".

Presence of fish in inlets and outlets: Record whether there are fish present in the first 100 m (200m for R6 crews) of each inlet and outlet stream by circling "Y" or "N" for each feature. If the stream habitat in a particular inlet or outlet is such that seeing fish would be difficult and you don't see any fish, circle "?". If there are no inlets or outlets, leave this section blank. If inlets and outlets are dry, fish may be present in isolated pools and this is data that needs to be captured.

Distance to first barrier on inlets and outlets: Pace off 100 meters (200m for R6 crews) of each tributary, recording the distance from the lake to the first impassable barrier. Dry tributaries should still be surveyed. The barrier location should be recorded as the number of meters from the lake. Barriers are falls >0.75 m high if there is no pool at the base, falls >1.5 m if there is a pool at the base, or steep cascades higher than approximately 1.5 m. Logjams can float during high water, and should generally not be considered barriers. Because fish can often get over remarkable obstacles, be conservative in what you call a barrier. Provide a description of each barrier on page 2 of the data sheet (see Detailed lake and inlet/outlet description, below) or in the barrier description field in the Palm. If there are no barriers write "none". If there are no inlets or outlets, leave this section blank.

Description of fish barrier(s), UTM coordinates, photo number: Provide a GPS UTM coordinate, photo number, and a brief description of each barrier in the spaces provided. If additional space is needed, use page 2 of the data sheet (see Detailed lake and inlet/outlet description, below). Record the photo file number. It is important to read the appropriate protocols for camera setup and file naming information. Make sure your GPS is setup with the proper settings referenced in the appropriate protocol.

Spawning habitat in inlets and outlets: Up to the first barrier of each inlet and outlet or to the end of the survey reach if no barrier exists, make a visual estimate of the amount of the streambed **between the lake and the first barrier** that is suitable trout spawning habitat. The amount of spawning habitat should be recorded in terms of the number of square meters of stream bottom with the following characteristics: gravel 0.5-4 cm in diameter and not cemented into the streambed, water depths of 10-50 cm, and water velocities of 20-60 cm/s for successful spawning.

Spawning habitat data is used to estimate whether fish populations are self-sustaining. Use good calibration techniques and real measurements as necessary to assure accuracy.

Evidence of spawning in inlets and outlets: Check each inlet and outlet for evidence of spawning **between the lake and the first barrier**, if a barrier is present. This could be spawning trout, redds (nests), or newly-hatched fry (20-30 mm). Redds are often very obvious, being patches of freshly cleaned gravel 0.5-1 m in length. If you aren't sure if what you are seeing is in fact a redd, dig into the downstream portion of the disturbed gravel while holding a net downstream. If it is a redd, you should find eggs in the net after disturbing the gravel. For each inlet and outlet, circle all types of evidence that you find. If you don't find any evidence of spawning, circle "None".

on the inlet and/or outlet diagrams on page two. Palm – use the comment field in amphibian header to note interesting or important observations, or the numbers of animals seen in inlets/outlets, or numbers of multi-age class tads observed.

Time of day, temperature, and weather are important factors affecting the quality of any VES survey. Time your surveys to be during the warm portions of the day (roughly 9am – 6pm, however time window can vary depending upon time of year and local conditions). If the weather is too cold or stormy, VES surveys can be very inaccurate and should not be conducted.

Amphibian/reptile observers: Record the names of all people looking for herpetofauna.

Survey start time and end time: Record the time at which the survey began and ended. The start time is the time the amphibian survey began, not the time you arrived at the site. The end time is the time you finished the VES. Record time as 24 hr time.

Total survey duration: Record the total time spent searching for amphibians/reptiles. Do not include time spent surmounting lake-side obstacles (e.g., cliffs), identifying specimens, or recording notes. If two people survey the same site by walking in opposite directions around the lake perimeter, the total survey duration should include the time spent surveying by each person. This data tells how much effort went into the survey.

Weather/wind/color/turbidity: Circle the appropriate descriptor for each.

Stream survey: Using the GPS unit, record the UTM locations at the beginning and end of your stream survey.

Stream order: Stream order is a classification based on branching of streams. On a map showing all intermittent and permanent streams, the smallest unbranched tributaries are designated order 1. Where two first order streams meet, a second order stream is formed. Where two second order streams meet, a third order stream is formed (and so on…). Using your 7.5' topo map, identify which order of stream you are surveying, and record it in the box provided.

Calling?: Were any frogs calling during your survey? Circle yes or no.

Voucher specimens/tissue samples: Will be collected from populations of mountain yellow-legged frogs. Note that this is done on a population basis and not for each site. Use best judgment in determining the parameters of the population. Up to 20 disease swabs from different individuals, usually adults, will be taken at the sites that support each population.

Survey Method: Circle the method used. Note: Mountain yellow-legged frogs do not have a significant call, so aural surveys will not apply.

Air and Water Temperatures: Measure the air temperature from the lake shore at 1 meter above the lake surface. Measure water temperature approximately 0.5m out from shore and 10cm under the water surface. When possible, temperatures should be measured during midday (1100 – 1500). Record the time that temperatures were measured after the @ symbol and the temperature units (C or F).

Detailed Lake and Inlet/Outlet Sketches

Drawing of lake perimeter, inlets, outlets and areas of special interest: Draw the lake perimeter as best you can, use the shape on the 7.5' map if necessary. The most important information that should be included on the sketch is the inlet and outlet locations and corresponding tributary number, max depth location, net set location, North arrow (see symbology below). If there is room, note any important Mountain yellow-legged frog habitat features, such as egg mass or larvae clusters. Add a second sketch if needed. The Palms do not have a lot of room for clutter on the sketch, so keep sketches simple and not cluttered with unnecessary information such as locations of trees, boulders, small islands, good cliff jumping locations, snow fields or talus fields.

Sketch symbology: North arrow = an N with a little arrow at the top; max depth = X ; net set location = a line from the shore; Inlets and Outlets should have tributary number and can be simplified to In1 or In2 for inlets and O1

Fish Surveying

Introduction: We will be conducting fish surveys at all bodies of water shown on 7.5' topographic maps and at sites not shown on the map but found during surveys and while traveling between sites.

Our fish survey methods are designed to provide an accurate representation of fish species composition and size structure in lakes and ponds, as well as provide an estimate of catch per unit effort (CPUE) at each location. In order to quantify the size structure of each fish species present at a particular location, we need a sample of at least 20 fish, and preferably not more than 50. Obviously, in lakes that have a very small fish population, capturing even 10 fish may not be possible.

We will set one net in each lake for 8-12 hours. Nets can be set at any time of day. To minimize logistical problems and safety hazards, do not pull nets at night. Time your net sets appropriately. For example, don't set a net at 5 PM, since this would mean either pulling the net at 1-5 AM or waiting until morning and exceeding the 12 hour maximum set duration. You should plan on setting nets in the late evening or early morning.

If you are setting a net in a lake with an extremely dense trout population (typically lakes with brook trout), you may want to paddle over the net with a float tube after 4 hours and get a rough count of the number of fish captured. If you have 40 or more fish after 4 hours, pull the net to avoid capturing an inordinate number of specimens. Use this 4 hour net set duration only when absolutely necessary. If gill-netting a lake that contains amphibians, you need not worry that the net will trap them. If turtles are present, set the gill nets during the day only and check the nets frequently to ensure that these species are not getting entangled.

Before setting a gill net, submerge the entire net (still contained on the handle); dry nets are much more susceptible to tangling. To set the net, put a small rock into each of two mesh bags and clip one bag to the shore end of the net (end with loop). Get in your float tube and wedge the bag between rocks at the lake shore and pull on it gently to ensure that it is firmly anchored. With the net lying across the float tube (lead-line on your left and net handle in your right hand or vice versa), paddle backwards slowly while feeding out the net. The net should be set perpendicular to the shore. If you encounter a tangle while feeding out the net, shake the net. Do not pull on the net as this will often tighten the tangle. Shaking will nearly always rid the net of the tangle. When you get to the end of the net, attach a float to the handle and then clip the second bag to the bottom of the net. Paddle backwards until the net is taught, and then drop the bag. Record the time when you finish setting the net.

After 8-12 hours, retrieve the net by pulling the mid-lake end of the net up by the float. Detach the float and the bag. Pull the net toward you, placing the float line on one side of the float tube and the lead line on the other. Continue pulling in the net until you reach the shore. Remove the second bag. To carry the net to an area for fish removal, cradle the net over your arms keeping the lead line on one side and the float line on the other. Lay the net down in a meadow or on a sandy flat (a meadow is preferable, but nearly any place will work; stay away from areas with lots of woody vegetation, pine needles, pine cones, and sharp rocks since they will get snagged in the net). Spread out the first 10 feet of net and remove the fish. After removing all fish from the first 10 feet of net, spread the next 10 feet of net and fold up the first 10 feet. Continue until you have removed all fish from the net. Restring the net onto the handle, rinse the net in the lake, dry the net in the shade, tie the net in a knot to prevent tangling, and stuff it into a sack. The net may be set again without sterilization if the receiving water is located **downstream** from the previous netting site. If the next netting site is located above the previous site, or in a separate drainage (even a small side drainage within the same basin) then the net must be sterilized (see sterilization protocol).

Fish survey method: If fish are observed, generally set a net. Record whether fish were surveyed visually or using gill nets. Except for small, shallow (<2 m) bodies of water in which the surveyor can see the entire lake bottom, we typically sample fish populations using gill nets. If there is any question as to whether fish are present in a lake, set a net. The only other exception is lakes/ponds where populations of yellow-legged frogs are present. The decision whether to set a gill net in a shallow pond is up to the crew leader, but keep in mind that fish can live in some very marginal habitats. If only a visual fish survey is needed (e.g., because the lake is < 2 m deep and you can see the entire bottom and there is positively no fish, or because there is a healthy population of frogs), you need not fill out the third and fourth pages of the datasheet. (For Palms this is the "Fish Subform.)

Field review of datasheets

At the end of each day, the crew leader should review all datasheets for completeness and clarity. Once review of a datasheet is completed, the crew leader should initialize the field review box on pages 2 and 3 of the datasheets. Make sure all of the spaces on the data sheets have been filled in. These data sheets are all the state has to show for the time and money that went into each survey. Protect the data sheets as if they were your most prized possession!

California Department of Fish and Game
Paiute Cutthroat Trout Restoration Project
Tamarack Lake Monitoring Plan to Assess Fish Presence
April 2009

Objectives

Using gill nets and backpack electro-fishers, CDFG will monitor Tamarack Lake three times during summer 2009, twice during summer of 2010, and fish gill nets during winter of 2009/2010. A single fish caught at any point during the monitoring effort will negate the need to continue the monitoring program and Tamarack Lake will be chemically treated.

Monitoring Method

Tamarack Lake will be monitored three times during the summer of 2009 and twice during the summer of 2010. Each visit will require two field personnel to remain in the field for multiple days. Additional personnel will be required to move gear to and from the field location as necessary. Additionally, amphibian monitoring will occur at Tamarack Lake once during summer 2009 and once during summer 2010 shortly before implementation of the Paiute Cutthroat Trout Restoration Project (Attachment 4).

Timing of the first monitoring effort of each summer is most crucial and should coincide closely with the spawning period of *Onchoryncus spp.*, or as soon as trail accessibility and lake ice conditions permit gill netting. From past experience, CDFG expects the first monitoring effort to occur in mid- to late June.

The first visit of summer 2009 will require a week of time; five days of monitoring and two days of travel. Gill nets will be set perpendicular to shore, evenly spaced, with consistent coverage of the entire lake. From past experience, CDFG expects 14 to 20 gill nets will sufficiently inundate the lake. The nets will be checked, cleaned and moved daily for five days. On the last day of monitoring, ten to fifteen gill nets will be set securely and left fishing until the next monitoring effort. All other gear will be stored securely at the field location.

The second visit will occur in mid-July 2009, as field season scheduling allows, and will require five days of time; 3 days of monitoring and two days of travel. Daily gill net work will occur in the same manner as described above, however no electro-fishing is necessary during the mid-summer site visit. Ten to fifteen nets will be left fishing between visits as described above.

The third monitoring visit will occur in late August or early September 2009 as field season scheduling allows. The visit will require a week of time, five days of monitoring and two days of travel. Gill netting methodology will follow the description above. All tributaries will be electro-fished daily for five days to target freshly emerged young of year. Ten over winter gill nets will be securely